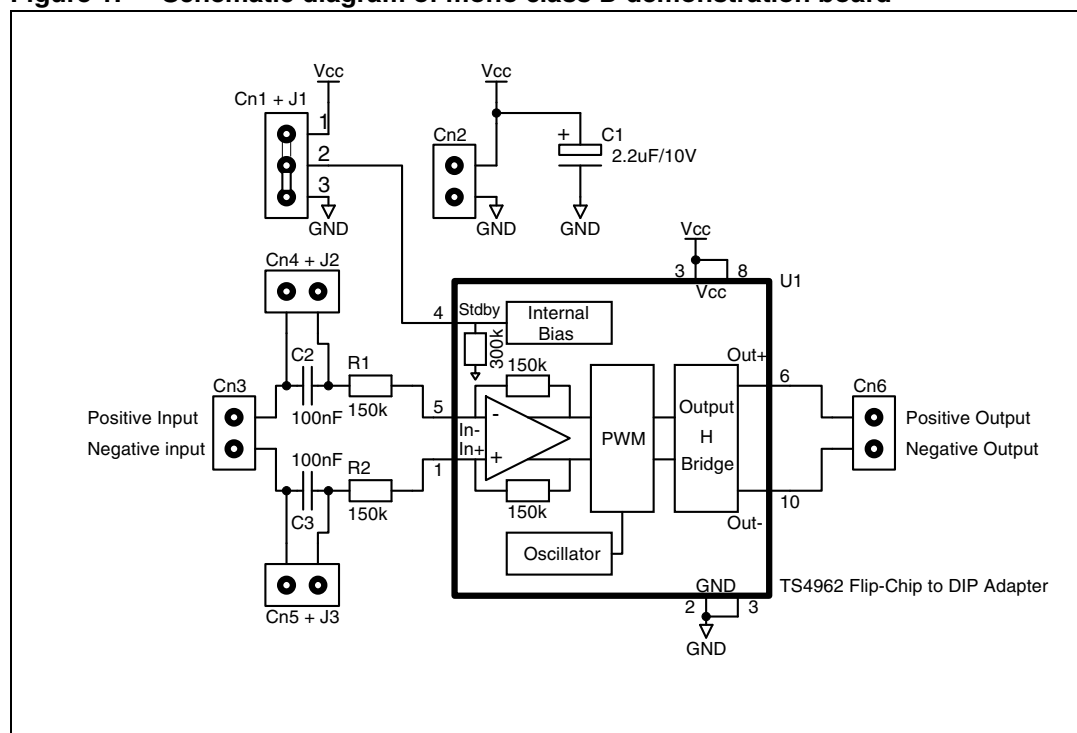


Introduction

The mono class D demo board STEVAL-CCA001V1 is designed for the TS4962M class D audio amplifier. The TS4962M device, in a Flip-Chip package, is mounted on an adapter board with DIP connectors (see [Section 6](#)) which is, in turn, mounted on the demonstration board. [Figure 1](#) shows the schematic diagram of the demonstration board, including the Flip-Chip to DIP adapter.

Figure 1. Schematic diagram of mono class D demonstration board



Contents

1	About the TS4962M	4
2	Description of the demonstration board	5
3	Demonstration board connectors	6
4	Demonstration board layout	6
5	Configuring the demonstration board characteristics	7
	5.1 Differential gain	7
	5.2 Input configuration	7
6	Flip-Chip to DIP adapter	8
7	Revision history	10

List of figures

Figure 1. Schematic diagram of mono class D demonstration board 1

Figure 2. Mono class D demonstration board - top view 5

Figure 3. PCB bottom layer 6

Figure 4. PCB top layer 6

Figure 5. Schematic diagram of the Flip-Chip to DIP adapter 8

Figure 6. Adapter top view 9

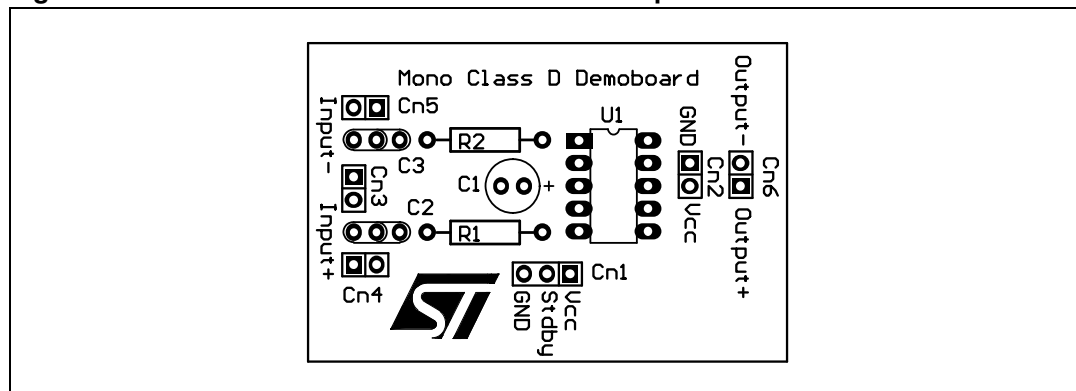
1 About the TS4962M

- Low voltage class D differential audio power amplifier with standby mode
- Operating range from $V_{CC}=2.4\text{ V}$ to 5.5 V
- 2.3 W output power @ $V_{CC}=5\text{ V}$, THD=1%, $F=1\text{ kHz}$, with $4\ \Omega$ load
- 1.4 W output power @ $V_{CC}=5\text{ V}$, THD=1%, $F=1\text{ kHz}$, with $8\ \Omega$ load
- Ultra low power consumption in standby mode (10 nA)
- 63 dB PSRR @ 217 Hz in grounded mode ($A_V=2\text{ V/V}$)
- Low pop and click noise
- Fast startup time 5 ms
- Module gain set at 2 V/V
- Thermal and short-circuit protection.

2 Description of the demonstration board

[Figure 2](#) shows the top view of the demo board STEVAL-CCA001V1, with the location of all connectors

Figure 2. Mono class D demonstration board - top view



A list of components mounted on the demonstration board is given in [Table 1](#).

Table 1. Mono class D demonstration board bill of material

Name	Quantity	Description
C1	1	2.2 μ F/10 V, electrolytic capacitor
C2	1	100 nF/63 V
C3	1	100 nF/63 V
Cn1	1	3-pin header 2.54 mm pitch
Cn2	1	2-pin header 2.54 mm pitch
Cn3	1	2-pin header 2.54 mm pitch
Cn4	1	2-pin header 2.54 mm pitch
Cn5	1	2-pin header 2.54 mm pitch
Cn6	1	3-pin header 2.54 mm pitch
J1 to J3	4	Jumper, 2.54 mm pitch
R1	1	150 k Ω , 1/4 W 1% resistor
R2	1	150 k Ω , 1/4 W 1% resistor
U1	1	TS4962M Flip-Chip to DIP adapter

[Table 2](#) gives the list of the connectors on the demonstration board, with a description and configuration information for each one.

3 Demonstration board connectors

Table 2. Demonstration board connectors

Connectors	Description
Cn3	Input signal connector (active input signal positive and negative)
Cn4 and Cn5	Connectors to modify input configuration (from capacitor-coupled = no jumper to common mode feedback = short-circuit)
Cn6	Output signal connector (Vo+ and Vo-)
Cn1	Standby control connector (GND, standby, V _{CC}).
Cn2	Power connector (V _{CC} and GND). Power supply voltage from 2.4 V to 5.5 V.
U1	Socket connector for Flip-Chip to DIP adapter

Caution: When the power is supplied through Cn2, **do not** invert the polarity as it can destroy the amplifier U1.

4 Demonstration board layout

Figure 3 and Figure 4 show the bottom and top layers of the demonstration board PCB.

Figure 3. PCB bottom layer

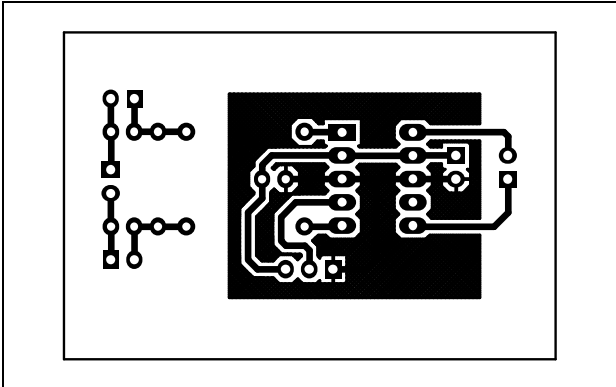
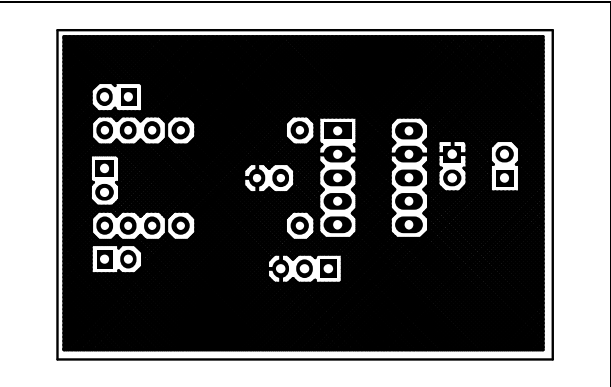


Figure 4. PCB top layer



5 Configuring the demonstration board characteristics

5.1 Differential gain

The demonstration board is set up with the differential gain, A_v , set to 2 V/V.

If necessary, the differential gain may be adapted by modifying the values of resistors R1 and R2, in accordance with the following relation:

Equation 1

$$A_v = \frac{300\text{k}\Omega}{R1} \text{ or } A_v = \frac{300\text{k}\Omega}{R2}$$

where R1=R2 in k Ω .

5.2 Input configuration

On the demonstration board, the Cn4 and Cn5 jumpers allow you to change the input configuration. You can select either capacitor-coupled or common-mode feedback.

In the capacitor-coupled configuration, the -3 dB cutoff frequency in Hz is:

Equation 2

$$\frac{1}{2\pi \times R_1 \times C_2} = \frac{1}{2\pi \times R_2 \times C_3}$$

with R in Ohms, C in Farads and where C2=C3.

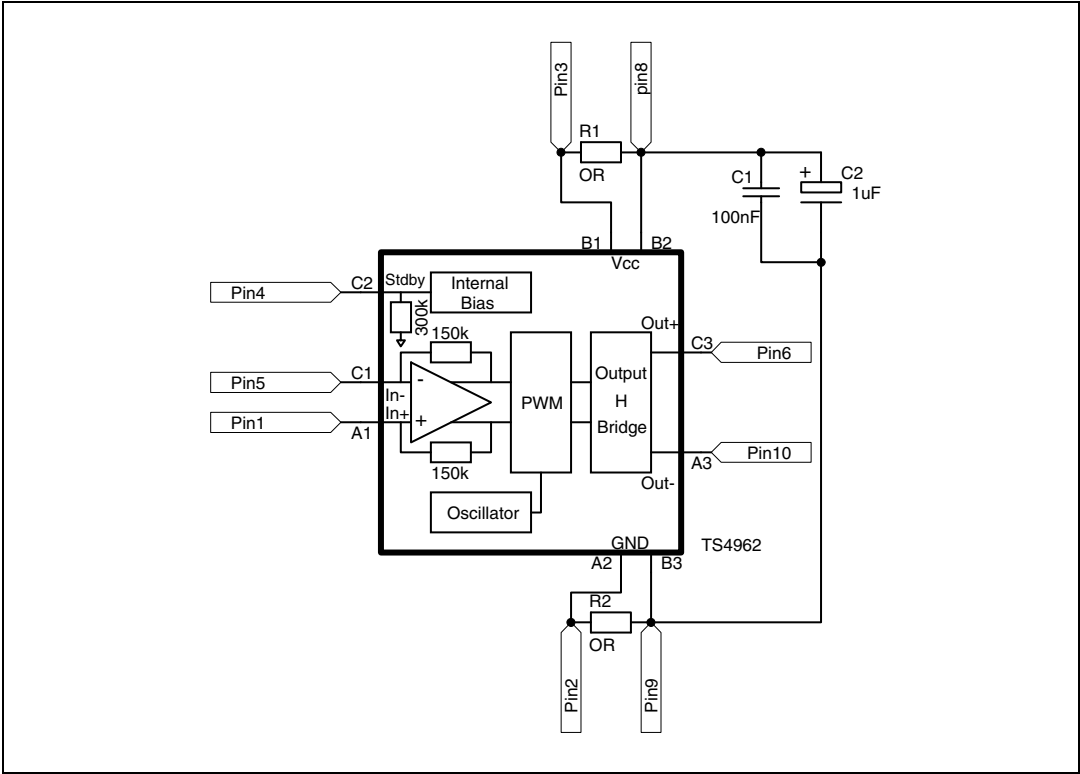
More information about component calculations is available in the TS4962M datasheet.

6 Flip-Chip to DIP adapter

The TS4962M is available in a Flip-Chip package which, while offering the advantages of excellent thermal dissipation and maximum space-savings, is difficult to manipulate for test or evaluation purposes.

For this reason, the TS4962M device is pre-mounted onto a Flip-Chip to DIP adapter, shown schematically in [Figure 5](#).

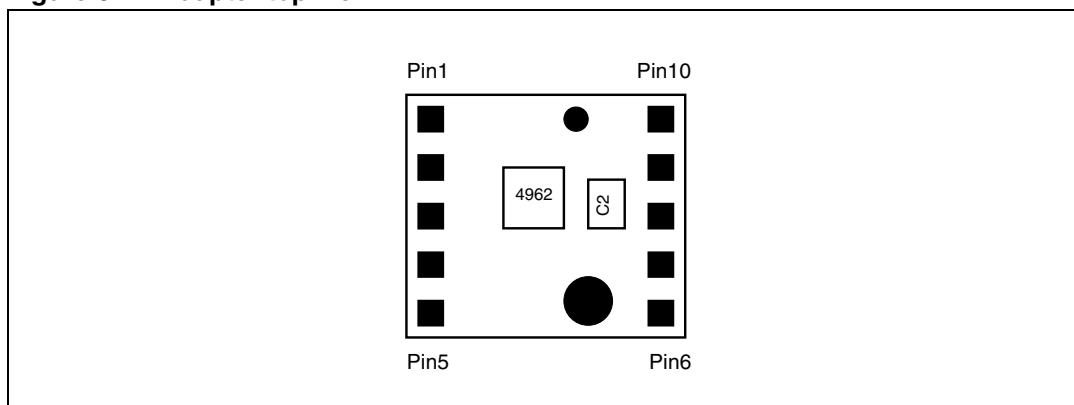
Figure 5. Schematic diagram of the Flip-Chip to DIP adapter



A component list for this adapter is given in [Table 3](#) below. The top-view of the adapter is shown in [Figure 6](#).

Table 3. Flip-Chip to DIP adapter bill of material

Designation	Quantity	Description
C1	1	100 nF/10 V, ceramic capacitor, 0603
C2	1	1 μ F/6.3 V, Tantalum capacitor, 0805
R1	1	0R resistor, 0603
R2	1	0R resistor, 0603
U1	1	TS4962M

Figure 6. Adapter top view

7 Revision history

Table 4. Document revision history

Date	Revision	Changes
1-Mar-2005	1	Initial release.
1-Dec-2005	2	Format updated.
6-Feb-2007	3	Updated document structure and format.
27-Feb-2007	4	Removed draft banner, added this revision history.
28-Mar-2012	5	Table 3 modified.

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